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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/604,578	07/31/2003	Tien-Jen Cheng	FIS920030103US1	1577

32074 7590 04/24/2006

INTERNATIONAL BUSINESS MACHINES CORPORATION  
DEPT. 18G  
BLDG. 300-482  
2070 ROUTE 52  
HOPEWELL JUNCTION, NY 12533

EXAMINER

HA, NATHAN W

ART UNIT	PAPER NUMBER
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2814

DATE MAILED: 04/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

<b>Office Action Summary</b>	Application No.	Applicant(s)	
	10/604,578	CHENG ET AL.	
	Examiner	Art Unit	
	Nathan W. Ha	2814	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 07 March 2006.
- 2a) ☐ This action is FINAL.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-20 is/are pending in the application.
- 4a) Of the above claim(s) 1-13 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 14-20 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |   |   |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)   | 4) <input type="checkbox"/> Interview Summary (PTO-413)<br>Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)  | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)             |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)<br>Paper No(s)/Mail Date <u>7/03</u> . | 6) <input type="checkbox"/> Other: _____  |

## DETAILED ACTION

### *Election/Restrictions*

1. Applicant's election without traverse of Group I, claims 14-20, in the reply filed on 3/7/06, is acknowledged.

### *Claim Rejections - 35 USC § 103*

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 14-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller et al. (US 4,518,112, hereinafter, Miller) and in view of Oh et al. (US 2004/0134974, hereinafter, Oh.)

In regard to claim 14, in fig. 1, Miller discloses an electrical structure comprising:

- a first set of contacts 16 in an electrical structure;
- at least one interface layer 18 adhering to the set of contacts;
- a set of pads 24 disposed over the set of contacts and including the interface layer;
- a set conductive pins 14 adhering directly to said pads, fig. 2;
- a barrier layer, not numbered, adhering to all exposed surfaces of the pin; and
- a layer of metal surrounding the barrier layer.

Miller, however, does not expressly disclose that the surrounding layer is made of solder. It should be noted that solder is also a conductive layer. It is widely used for electrical connection since it is inexpensive compared to gold, and it is easier to form since it requires lower melting temperature. For instance, Oh discloses an electrical connection structure including metal layer as seed layer and adhesive 406 and 407, pin 411, and solder 405 is disposed over the pin in order to protect the pin and provide electrical connections to external devices. See also, fig. 4a.

Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to substitute solder layer as taught by Oh in order to fully take the advantage as mentioned.

It should be further noted that, even though Miller show the pin in a singular form, but it would be understood that a connection structure requires more than one pin.

In regard to claim 15, Miller further shows that the metal barrier is capable of blocking passage of metal from the pin since it is made of different material.

In regard to claims 16 and 17, Miller discloses the interface layer is made of Nickel. Nickel is known and capable as a seed and adhesive material. See also, col. 4, lines 4-5.

In regard to claim 20, Miller discloses that the Au layer 20 is formed on the barrier layer. See also, col. 4, lines 1-4.

In regard to claims 18-19, Miller does not disclose that the seed layer is made of TiW. The seed layer in Miller may be substituted by TiW since this compound provides

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a better adhesion and higher electrical connectivity, also, stronger bonding between layers. See paragraph [0028].

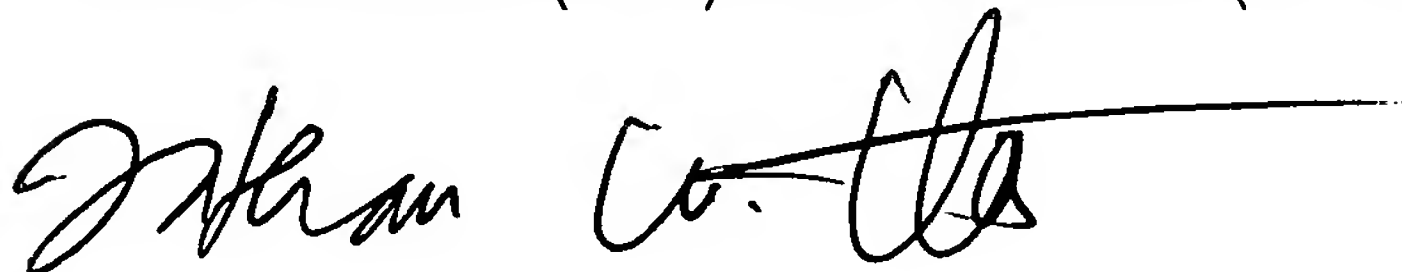
Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to substitute TiW layer as taught by Oh in order to fully take the advantage as mentioned.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Nathan W. Ha whose telephone number is (571) 272-1707. The examiner can normally be reached on M-TH 8:00-7:00(EST).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

A handwritten signature in black ink, appearing to read 'Nathan Ha', with a long horizontal line extending to the right.

Nathan Ha

4/17/06